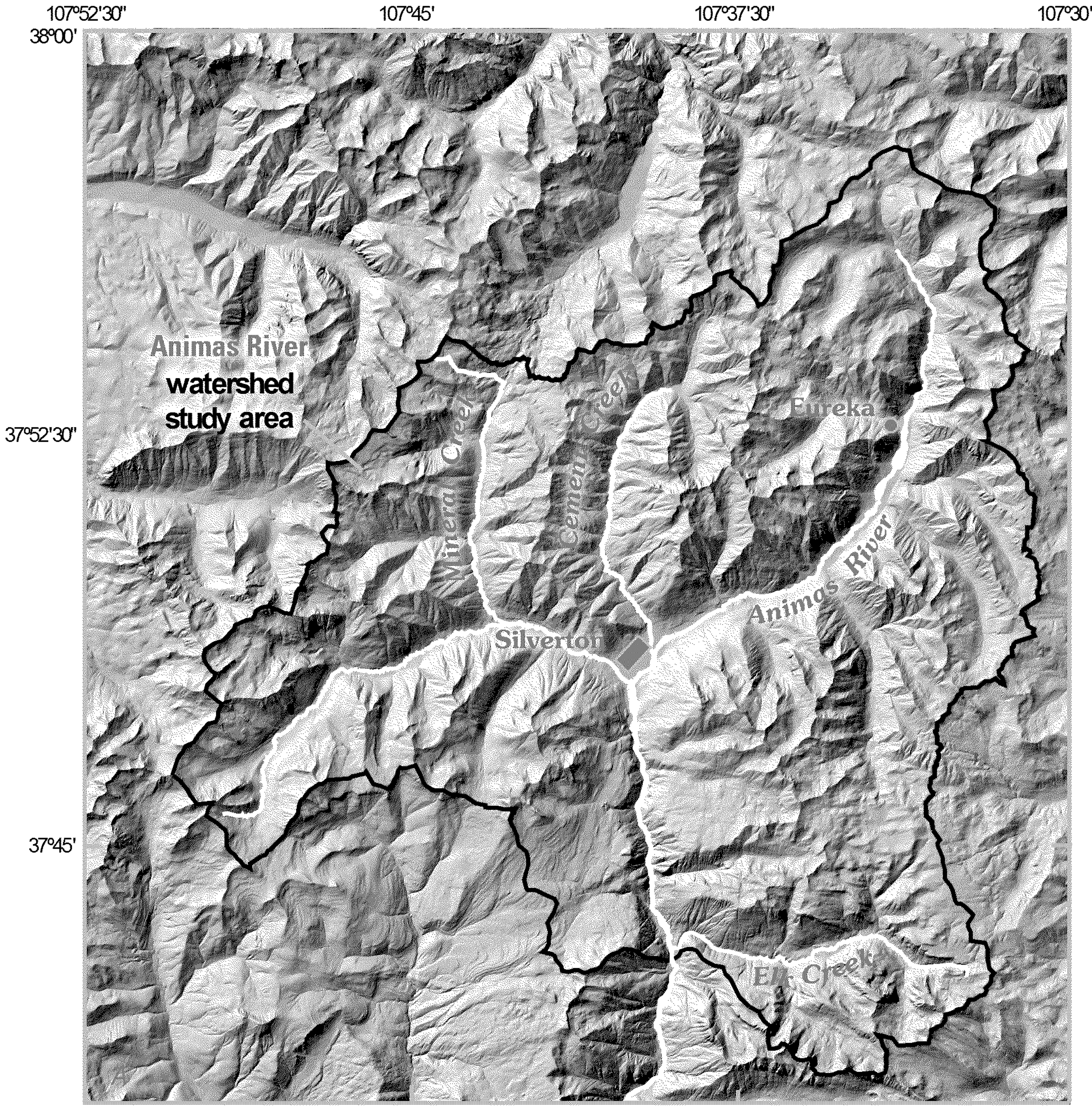

Figure 2. Animas River watershed study area labeling the Animas River and the main tributaries, Mineral and Cement Creeks, affected by historical mining. *A*, shaded relief map; *B*. location of features in text. Study area boundary in black.

The study area (fig. 2*A*) is subdivided into three large basins, the Mineral Creek and Cement Creek basins (52.5 mi^2 and 20.1 mi^2) and the upper Animas River basin (70.6 mi^2). Drainage basin areas of tributary streams to the mainstem drainages are referred to as "subbasins." Subbasins discussed in some of the chapters in section E include the headwaters area of the upper Animas River upstream from Eureka; Ross Basin, which is the headwaters area of Cement Creek; South Fork Mineral Creek subbasin, which extends outside the Silverton caldera margin to the west and is underlain by a large volume of Mesozoic and Paleozoic sedimentary rocks; and Mineral Creek upstream from the confluence with South Fork Mineral Creek.

Ground-water flow in the Animas River watershed is largely controlled by topography, distribution of unconsolidated Quaternary deposits that overlie bedrock units, and the decreasing hydraulic conductivity of geologic units with depth. Topography strongly controls direction of ground-water flow and location of discharge areas. Recharge occurs on topographic highs, with greater amounts of recharge on

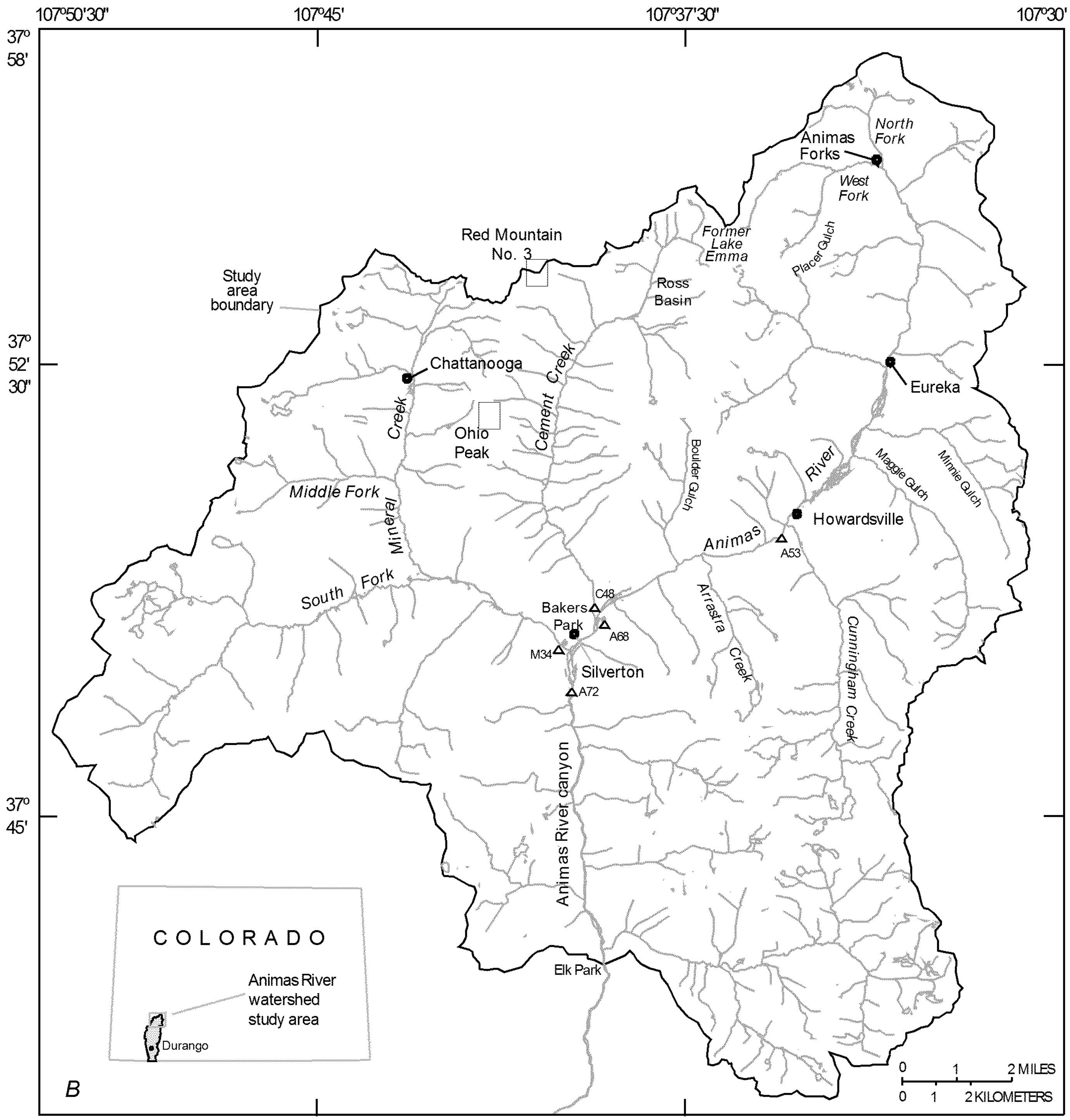

Figure 2—Continued. Animas River watershed study area. *B*, location of features in text. Small triangle, streamflow gauging station.

areas with the greatest precipitation and hydraulic conductivity. Ground-water discharge, in the form of numerous seeps and small springs, occurs in topographic lows and at breaks in land-surface slope. Ground-water flow paths, from recharge to discharge areas, are short (commonly less than a few thousand feet). Regional ground-water flow is limited by the very low permeability of the bedrock. The upper, thin unit of unconsolidated deposits has the highest hydraulic conductivity. The uppermost, fractured and weathered zone in the igneous bedrock has a lower hydraulic conductivity than the unconsolidated deposits. Fractures are the major conduits for ground-water flow in bedrock, with more flow in the uppermost zone where the fractures are weathered and open.

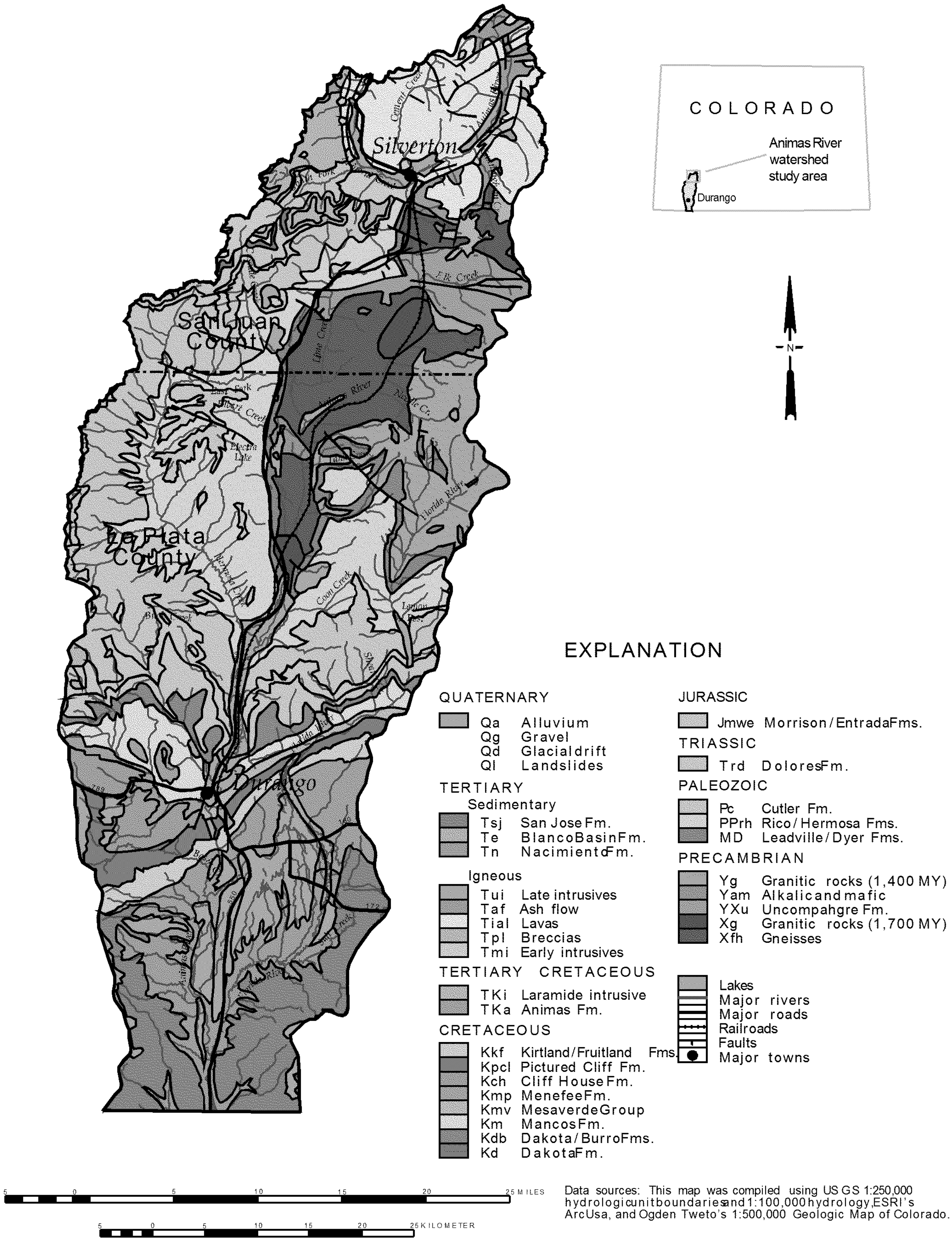

Figure 4. Generalized geology of the Colorado part of the Animas River watershed (digitized from Tweto, 1979).

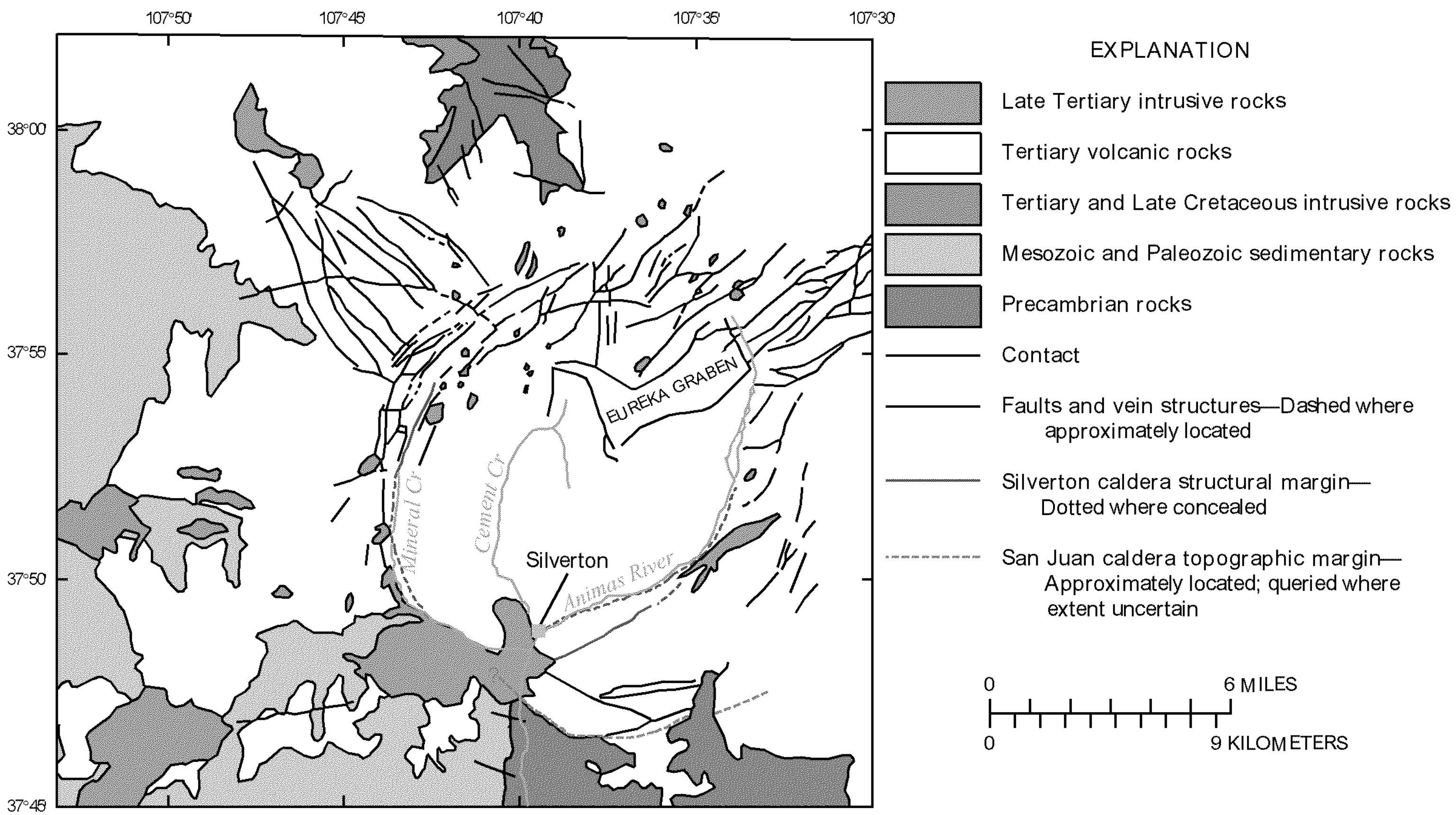

Figure 5. Generalized structure and geology of Silverton caldera, Animas River watershed study area and vicinity. Animas River and Mineral Creek follow structural margin of the Silverton caldera. In addition to the ring fractures that were created when the Silverton and the earlier San Juan calderas formed, radial and graben faults, which host much of the subsequent vein mineralization, are shown schematically (modified from Casadevall and Ohmoto, 1977).